

## **REMARKS**

### **I. INTRODUCTION**

Claims 1, 7 and 14 have been amended. Support for the claim amendments can be found at least at page 7, lines 8-16 and page 13, lines 14-16. Thus, claims 1-7 and 14 remain pending in the present application. No new matter has been added. In light of the above amendments and the following remarks, Applicants respectfully submit that all presently pending claims are in condition for allowance.

### **II. THE CLAIMS OBJECTION SHOULD BE WITHDRAWN**

Claim 14 stands objected to due to informalities. In view of the amendment to claim 14, the withdrawal of this objection is respectfully requested.

### **IV. THE 35 U.S.C. § 101 REJECTION SHOULD BE WITHDRAWN**

Claim 14 stands rejected under 35 U.S.C. § 101 for being directed towards non-statutory subject matter. Specifically, the Examiner states that claim 14 encompasses nothing more than logic/software. (*See* 11/2/11 Office Action, p. 4). Applicants have amended claim 14 so that the claim is directed towards hardware and not software. Accordingly, the withdrawal of this rejection is respectfully requested.

### **VII. 35 U.S.C. § 103(a) REJECTIONS SHOULD BE WITHDRAWN**

Claims 1, 4, 5, 7, 8, and 14 stand rejected under 35 U.S.C. 103(a) as unpatentable over Liu et al. (U.S. Patent No. 6,199,041) in view of Liljeryd et al. (U.S. Pat. Publ. No. 2004/0125878).

Claim 1, as amended, recites, “[a] method for generating training data for an automatic speech recognizer operating at a first sampling frequency, comprising the following steps: deriving spectral characteristics from audio data sampled at a second frequency lower than the first sampling frequency; *extending a bandwidth of the spectral characteristics by retrieving bandwidth extending information from a codebook so that*

*the audio data sampled at the second frequency is compatible with the automatic speech recognizer operating at the first sampling frequency; and processing the bandwidth extended spectral characteristics to give the required training data, wherein extending the bandwidth includes augmenting the spectral characteristics of the audio data sampled at the second frequency with a set of spectral characteristics of audio data sampled at the first sampling frequency obtained from the codebook.”*

The Examiner correctly acknowledges that Liu fails to disclose “*extending a bandwidth of the spectral characteristics by retrieving bandwidth extending information from a codebook so that the audio data sampled at the second frequency is compatible with the automatic speech recognizer operating at the first sampling frequency,*” as recited in claim 1. (See 11/2/11 Office Action, p. 5). To cure this deficiency, the Examiner relies on Liljeryd.

Liljeryd discloses a method for the enhancement of source coding systems. (See Liljeryd, Abstract). Liljeryd also discloses that “a truncated harmonic series can be extended based on the direct relation between lowband and highband spectral components.” (*Id.* at ¶ [0007]). After this process, the extended series resembles the original series. (See *Id.*). In fact, Liljeryd discloses that “the spectral envelope...of the replicated highband, must reasonable well resemble that of *the original signal*.” (See *Id.*)(emphasis added). Liljeryd’s process depends exclusively on information in the lowband/lowpass signal. (*Id.* at ¶ [0008]). The spectral envelope of this signal is determined “using polynomials together with a set of rules or a codebook.” (See *Id.*). So, the codebook of Liljeryd is used to determine the spectral envelope of the lowband/lowpass signal.

The rules in Liljeryd’s codebook are used to reconstruct the original series as described above. SBR is the acronym for spectral band replication and specifically, SBR-1 was developed for use with the MPEG-4 AAC. SBR “replicates higher frequency content by transposing up harmonics from the lower and midfrequencies” transmitted by the codec. (See Wikipedia, “Spectral Band Replication”) (referring to Clark Novak,

*Spectral Band Replication and aacPlus Coding – An Overview*). Thus, Liljeryd is concerned with enhancing source codecs to reconstruct a compressed original signal. Liljeryd is silent regarding information in the codebook that allows an extension of bandwidth including “*augmenting the spectral characteristics of the audio data sampled at the second frequency with a set of spectral characteristics of audio data sampled at the first sampling frequency*,” as recited in claim 1. Thus, Liljeryd fails to cure the deficiencies of Liu.

Furthermore, Applicants note that although the Examiner admits that Liu fails to disclose the extending step of claim 1, the Examiner states that Liu processes the bandwidth extended spectral characteristics. (See 11/2/11 Office Action, p. 5). The Examiner refers to column 6, lines 50-65 to meet this recitation. However, it seems that this portion of Liu discusses training data and the Examiner is relying on Liljeryd to teach “*extending a bandwidth of the spectral characteristics by retrieving bandwidth extending information from a codebook so that the audio data sampled at the second frequency is compatible with the automatic speech recognizer operating at the first sampling frequency*.” However, since Liljeryd fails to teach “*extending a bandwidth...wherein extending the bandwidth includes augmenting the spectral characteristics of the audio data sampled at the second frequency with a set of spectral characteristics of audio data sampled at the first sampling frequency obtained from the codebook*,” then, consequently, Liu fails to disclose or suggest “processing the bandwidth extended spectral characteristics to give the required training data.”

Applicants respectfully submit that Liu and Liljeryd, alone or together, fail to disclose or suggest “*extending a bandwidth of the spectral characteristics by retrieving bandwidth extending information from a codebook so that the audio data sampled at the second frequency is compatible with the automatic speech recognizer operating at the first sampling frequency*”; and processing the bandwidth extended spectral characteristics to give the required training data, *wherein extending the bandwidth includes augmenting the spectral characteristics of the audio data sampled at the second frequency with a set of spectral characteristics of audio data sampled at the first sampling frequency obtained*

*from the codebook*” as recited in claim 1. Thus, the withdrawal of the 35 U.S.C. § 103(a) rejection of claim 1 and its dependent claims 4, 5, 7, and 8 is respectfully requested.

Independent claim 14 recites limitations that are substantially similar to those of claim 1. Therefore, the withdrawal of the rejection of claim 14 is respectfully requested for at least the foregoing reasons presented with regards to claim 1.

Claims 2 and 3 stand rejected under 35 U.S.C. 103(a) as unpatentable over Liu and Liljeryd in view of Enbom et al. (“Bandwidth Expansion of Speech Based on Vector Quantization of the Mel Frequency Cepstral Coefficients”). Claim 6 stands rejected under 35 U.S.C. 103(a) as unpatentable over Liu and Liljeryd in view of Gong et al. (U.S. Patent No. 6,381,571).

Applicants respectfully submit that Enbom and Liljeryd also fail to cure the deficiencies of Liu and that Liu, Liljeryd, Enbom, and Gong, alone or in any combination, fail to disclose or suggest “*extending a bandwidth of the spectral characteristics by retrieving bandwidth extending information from a codebook so that the audio data sampled at the second frequency is compatible with the automatic speech recognizer operating at the first sampling frequency*”; and processing the bandwidth extended spectral characteristics to give the required training data, *wherein extending the bandwidth includes augmenting the spectral characteristics of the audio data sampled at the second frequency with a set of spectral characteristics of audio data sampled at the first sampling frequency obtained from the codebook*” as recited in claim 1. Because claims 2, 3, and 6 depend on and, therefore, contain all of the limitations of claim 1, the withdrawal of the rejection of these claims is respectfully requested.

**CONCLUSION**

In light of the foregoing, Applicant respectfully submits that all of the now pending claims are in condition for allowance. All issues raised by the Examiner having been addressed, an early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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